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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/603,712	06/25/2003	Minjoo L. Lee	MIT.9889	3454
7590 10/26/2004			EXAMINER	
Samuels, Gauthier & Stevens LLP			WILSON, ALLAN R	
Suite 3300			ART UNIT	
225 Franklin Street			PAPER NUMBER	
Boston, MA 02110			2815	

DATE MAILED: 10/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/603,712

Applicant(s)

LEE ET AL.

Examiner

Allan R. Wilson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 17 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-81 is/are pending in the application.
- 4a) Of the above claim(s) 1-42 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 57-68 is/are allowed.
- 6) ☒ Claim(s) 43-55 and 69-81 is/are rejected.
- 7) ☒ Claim(s) 56 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 0603 and 0204.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

Per a phone interview with Matthew Connors on September 28, 2004, Applicants elected Group I not Group II.

Applicant's election of Group I, claims 43-81, in the reply filed on September 17, 2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the MOSFET, PMOS, NMOS and CMOS must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the

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drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

Claim(s) 43, 57 and 69 are objected to because of the following informalities: The phrase "said substrate having a Ge content between 0.51 and 0.80" is confusing. The specification disclosed it is the SiGe layer not the substrate that has the Ge content between 0.51 and 0.80. Appropriate correction is required.

Claim 72 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The "hole mobility enhancement that increases with effective vertical field" is in claim 69.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 43-55 and 69-81 are rejected under 35 USC § 102(b) as being anticipated by Chu et al. ("Chu") U.S. Patent No. 5,906,951.

With regards to claim 43, Chu illustrates in figures 1-5, particularly figure 3, (entire document) a substrate 26; a SiGe layer 17, 18 having a relaxed SiGe portion 18 that is formed on said substrate, said SiGe layer with portion 17 having a Ge content between 0.51 and 0.80; and a  $\epsilon$ -Si layer 16 that is deposited on said relaxed SiGe layer.

With regards to claims 44 and 70, Chu discloses in col. 3, lines 5-6, said  $\epsilon$ -Si layer is sized approximately at 45Å (4.5nm).

With regards to claims 45 and 71, Chu illustrates in fig. 3 said relaxed SiGe layer 17, 18 is planarized.

With regards to claims 46-48, 69 and 72-74, the limitation "a hole mobility enhancement that increases with effective vertical field," "aid hole mobility enhancement saturates approximately around 2.5" and "said  $\epsilon$ -Si layer shifts the hole wave function away from the surface of said  $\epsilon$ -Si layer" are an inherent function of the structure and since the prior art has the same structure and materials as the claimed invention it will have the same inherent function.

With regards to claims 49, 51, 52, 75, 77 and 78, Chu illustrates in fig. 3 said substrate comprises a crystalline substrate 26 and an insulating oxide layer 28.

With regards to claims 50 and 76, Chu illustrates in fig. 1 a crystalline Si substrate 12 and a relaxed SiGe graded layer 13.

With regards to claims 53-55 and 79-81, Chu discloses in col. 1, lines 5-10, a CMOS device which will inherently have a PMOS and NMOS.

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*Allowable Subject Matter*

Claims 57-68 are allowed provided the claim 57 objection is overcome.

Claim 56 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

*Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Mohammad (illustrates an Si/SiGe alternate structure on SiGe), Hernandez et al. (illustrates a Si/SiGe alternate structure with 0 to 1 Ge), Maa et al. (illustrates Si on relaxed SiGe) and Chu et al., 6,350,993 (illustrates Si on SiGe with .5 to 1 Ge).

Field of Search	Date
U.S. Class and subclass: 257/18-20, 350	30 September 2004
Other Documentation: None	N/A
Electronic data base(s): EAST (USPAT, US-PGPUB, JPO, EPO, Derwent, IBM TDB)	30 September 2004

Any inquiry concerning this communication or earlier communications from an examiner should be directed to Primary Examiner Allan Wilson whose telephone number is (571) 272-1738. Examiner Wilson can normally be reached 7:00-4:00 Monday-Thursday and 6:00-3:00 on Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'A. Wilson', with a long horizontal flourish extending to the right.

Allan R. Wilson  
Primary Examiner  
30 September 2004